

Appendix B

APPLICABLE TABLES AND LANGUAGE FROM STANDARDS AND RACM

Appendix B is a collection of common used tables and language that are referenced in the *Residential Compliance Manual* which includes excerpts from the *2013 Building Energy Efficiency Standards for Residential and Nonresidential Buildings* and the *Appliance Efficiency Regulations*.

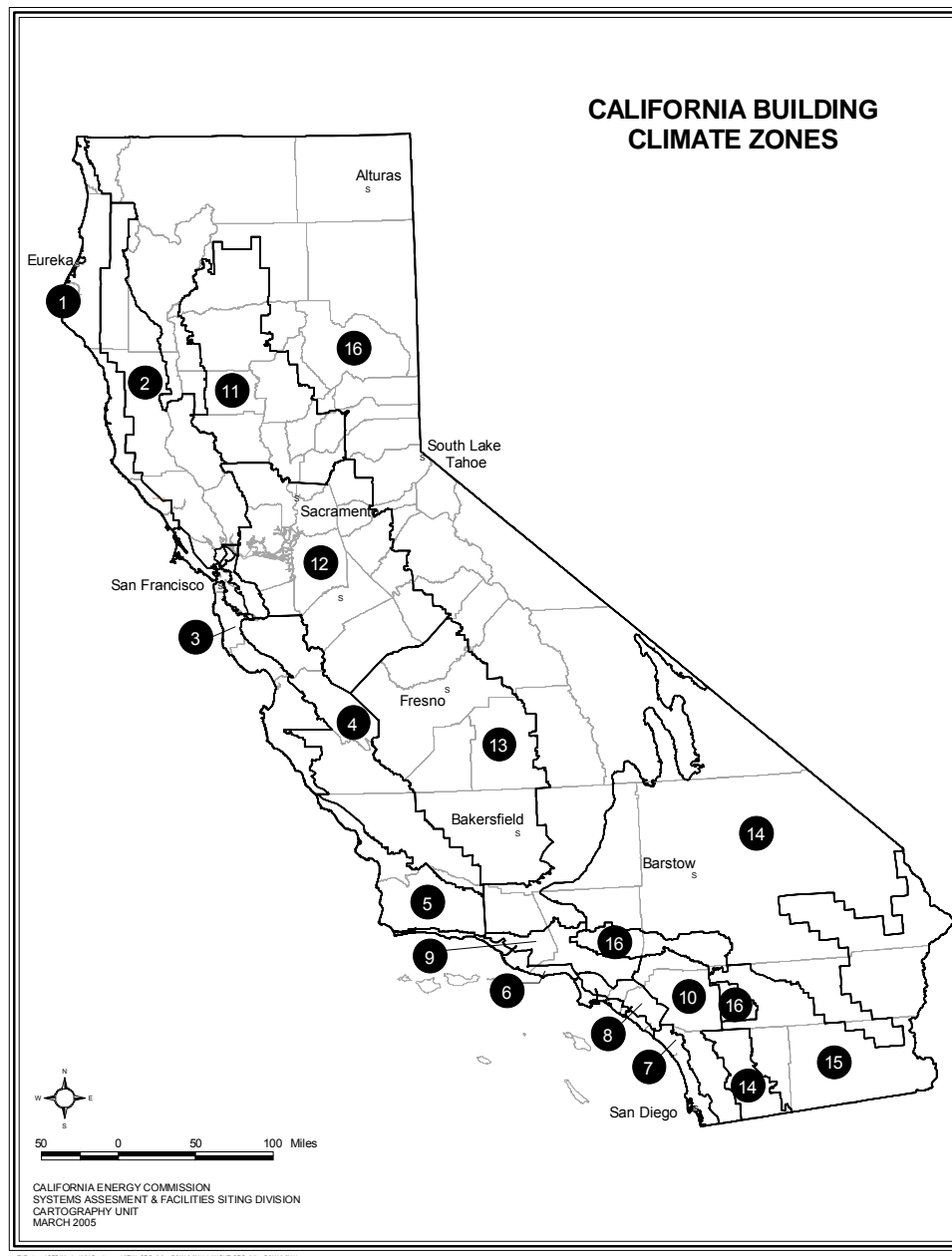


FIGURE 100.1-A—CALIFORNIA CLIMATE ZONES

TABLE 100.0-A APPLICATION OF STANDARDS

Occupancies	Application	Mandatory	Prescriptive	Performance	Additions/ Alterations
General Provisions		100.0, 100.1, 100.2, 110.0, 110.10			
Nonresidential, High-Rise Residential, And Hotels/Motels	General	140.0	140.2	140.1	141.0
	Envelope (conditioned)	110.6, 110.7, 110.8,120.7	140.3		
	Envelope (unconditioned process spaces)	N.A.	140.3(c)		
	HVAC (conditioned)	110.2, 110.5, 120.0- 120.5, 120.8	140.4		
	Water Heating	110.3, 120.3, 120.8	140.5		
	Indoor Lighting (conditioned, process spaces)	110.9, 120.8, 130.0, 130.1, 130.4	140.3(c), 140.6	N.A.	
	Indoor Lighting (unconditioned=and parking garages)	110.9, 120.8, 130.0, 130.1, 130.4	140.3(c), 140.6		
	Outdoor Lighting	110.9, 130.0, 130.2, 130.4	140.7		
	Building Electrical Power	130.5	N.A.		
	Pool and Spa Systems	110.4, 150.0(p)	N. A.		N. A.
	Solar Ready Buildings	110.10	N.A.	N.A.	
Covered Processes ¹	Envelope, Ventilation, Process Loads	110.2, 120.6, 120.8	140.9	140.1	120.6, 140.9
Signs	Indoor and Outdoor	130.0, 130.3	140.8	N.A.	141.0
Low-Rise Residential	General	150.0	150.1(a, c)	150.1(a, b)	150.2
	Envelope (conditioned)	110.6, 110.7, 110.8, 150.0(a-e, g, l)			
	HVAC (conditioned)	110.2, 110.5, 150.0(h, i, m, o)			
	Water Heating	110.3, 150.0(j, n)			
	Indoor Lighting (conditioned, unconditioned and parking garages)	110.9, 130.0, 150.0(k)			
	Outdoor Lighting	110.9, 130.0,150.0(k)			
	Pool and Spa Systems	110.4, 150.0(p)	N. A.	N.A.	N.A.
	Solar Ready Buildings	110.10	N. A.	N.A.	N.A.

¹ Nonresidential, high-rise and hotel/motel buildings that contain covered processes may conform to the applicable requirements of both occupancy types listed in this table.

¹ Nonresidential, high-rise and hotel/motel buildings that contain covered processes may conform to the applicable requirements of both occupancy types listed in this table.

TABLE 110.2-A ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS – MINIMUM EFFICIENCY REQUIREMENTS

Equipment Type	Size Category	Efficiency ^a		Test Procedure ^c
		Before 1/1/2015	After 1/1/2015	
Air conditioners, air cooled both split system and single package	≥ 65,000 Btu/h and < 135,000 Btu/h	11.2 EER ^b 11.4 IEER ^b	Applicable minimum efficiency values as determined by Title 20 California Code of Regulations Section 1605.1	ANSI/AHRI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	11.0 EER ^b 11.2 IEER ^b		ANSI/AHRI 340/360
	≥ 240,000 Btu/h and < 760,000 Btu/h	10.0 EER ^b 10.1 IEER ^b		
	≥ 760,000 Btu/h	9.7 EER ^b 9.8 IEER ^b		
Air conditioners, water cooled	≥ 65,000 Btu/h and < 135,000 Btu/h	12.1 EER ^b 12.3 IEER ^b		ANSI/AHRI 340/360
	≥135,000 Btu/h and < 240,000 Btu/h	12.5 EER ^b 12.5 IEER ^b		ANSI/AHRI 340/360
	≥240,000 Btu/h and < 760,000 Btu/h	12.4 EER ^b 12.6 IEER ^b		ANSI/AHRI 340/360
	≥ 760,000 Btu/h	12.2 EER ^b 12.4 IEER ^b		ANSI/AHRI 340/360
Air conditioners, evaporatively cooled	≥65,000 Btu/h and < 135,000 Btu/h	12.1 EER ^b 12.3 IEER ^b		ANSI/AHRI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	12.0 EER ^b 12.2 IEER ^b		ANSI/AHRI 340/360
	≥240,000 Btu/h and < 760,000 Btu/h	11.9 EER ^b 12.1 IEER ^b		ANSI/AHRI 340/360
	≥ 760,000 Btu/h	11.7 EER ^b 11.9 IEER ^b		ANSI/AHRI 340/360
Condensing units, air cooled	≥ 135,000 Btu/h	10.5 EER 11.8 IEER		ANSI/AHRI 365
Condensing units, water cooled	≥ 135,000 Btu/h	13.5 EER 14.0 IEER		
Condensing units, evaporatively cooled	≥ 135,000 Btu/h	13.5 EER 14.0 IEER		
IEERs are only applicable to equipment with capacity control as per ANSI/AHRI 340/360 test procedures				
Deduct 0.2 from the required EERs and IEERs for units with a heating section other than electric resistance heat.				
^c . Applicable test procedure and reference year are provided under the definitions.				

Standards Tables 110.2-B**TABLE 110.2-B UNITARY AND APPLIED HEAT PUMPS, MINIMUM EFFICIENCY REQUIREMENTS**

Equipment Type	Size Category	Subcategory or Rating Condition	Efficiency ^a	Test Procedure ^c
Air Cooled (Cooling Mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	Split system and single package	11.0 EER ^b 11.2 IEER ^b	ANSI/AHRI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h		10.6 EER ^b 10.7 IEER ^b	
	≥ 240,000 Btu/h		9.5 EER ^b 9.6 IEER ^b	
Water source (cooling mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	86°F entering water	12.0 EER	ISO-13256-1
Groundwater source (cooling mode)	< 135,000 Btu/h	59°F entering water	16.2 EER	ISO-13256-1
Ground source (cooling mode)	< 135,000 Btu/h	77°F entering water	13.4 EER	ISO-13256-1
Water source water-to-water (cooling mode)	< 135,000 Btu/h	86°F entering water	10.6 EER	ISO-13256-2
Groundwater source water-to-water (cooling mode)	< 135,000 Btu/h	59°F entering water	16.3 EER	ISO-13256-1
Ground source brine-to-water (cooling mode)	< 135,000 Btu/h	77°F entering water	12.1 EER	ISO-13256-2
Air Cooled (Heating Mode) Split system and single package	≥ 65,000 Btu/h and < 135,000 Btu/h (cooling capacity)	47° F db/43° F wb outdoor air	3.3 COP	ANSI/AHRI 340/360
		17° F db/15° F wb outdoor air	2.25 COP	
	≥ 135,000 Btu/h (cooling capacity)	47° F db/43° F wb outdoor air	3.2 COP	
		17° F db/15° F wb outdoor air	2.05 COP	
Water source (heating mode)	< 135,000 Btu/h (cooling capacity)	68°F entering water	4.2 COP	ISO-13256-1
Groundwater source (heating mode)	< 135,000 Btu/h (cooling capacity)	50°F entering water	3.6 COP	ISO-13256-1
Ground source (heating mode)	< 135,000 Btu/h (cooling capacity)	32°F entering water	3.1 COP	ISO-13256-1
Water source water-to-water (heating mode)	< 135,000 Btu/h (cooling capacity)	68°F entering water	3.7 COP	ISO-13256-2
Groundwater source water-to-water (heating mode)	< 135,000 Btu/h (cooling capacity)	50°F entering water	3.1 COP	ISO-13256-2
Ground source brine-to-water (heating mode)	< 135,000 Btu/h (cooling capacity)	32°F entering water	2.5 COP	ISO-13256-2

^a IEERs are only applicable to equipment with capacity control as per ANSI/AHRI 340/360 test procedures.

^b Deduct 0.2 from the required EERs and IEERs for units with a heating section other than electric resistance heat.

^c Applicable test procedure and reference year are provided under the definitions.

Standards Tables 110.6-A and 110.6-B

TABLE 110.6-A DEFAULT FENESTRATION PRODUCT U-FACTORS

FRAME	PRODUCT TYPE	SINGLE PANE ^{3,4} U-FACTOR	DOUBLE PANE ^{1,3,4} U-FACTOR	GLASS BLOCK ^{2,3} U-FACTOR
Metal	Operable	1.28	0.79	0.87
	Fixed	1.19	0.71	0.72
	Greenhouse/garden window	2.26	1.40	N.A.
	Doors	1.25	0.77	N.A.
	Skylight	1.98	1.30	N.A.
Metal, Thermal Break	Operable	N.A.	0.66	N.A.
	Fixed	N.A.	0.55	N.A.
	Greenhouse/garden window	N.A.	1.12	N.A.
	Doors	N.A.	0.59	N.A.
	Skylight	N.A.	1.11	N.A.
Nonmetal	Operable	0.99	0.58	0.60
	Fixed	1.04	0.55	0.57
	Doors	0.99	0.53	N.A.
	Greenhouse/garden windows	1.94	1.06	N.A.
	Skylight	1.47	0.84	N.A.

For all dual-glazed fenestration products, adjust the listed U-factors as follows:

Add 0.05 for products with dividers between panes if spacer is less than 7/16 inch wide.

Add 0.05 to any product with true divided lite (dividers through the panes).

Translucent or transparent panels shall use glass block values when not rated by NFRC 100.

Visible Transmittance (VT) shall be calculated by using Reference Nonresidential Appendix NA6.

Windows with window film applied that is not rated by NFRC 100 shall use the default values from this table.

TABLE 110.6-B DEFAULT SOLAR HEAT GAIN COEFFICIENT (SHGC)

FRAME TYPE	PRODUCT	GLAZING	FENESTRATION PRODUCT SHGC		
			Single Pane ^{2,3} SHGC	Double Pane ^{2,3} SHGC	Glass Block ^{1,2} SHGC
Metal	Operable	Clear	0.80	0.70	0.70
	Fixed	Clear	0.83	0.73	0.73
	Operable	Tinted	0.67	0.59	N.A.
	Fixed	Tinted	0.68	0.60	N.A.
Metal, Thermal Break	Operable	Clear	N.A.	0.63	N.A.
	Fixed	Clear	N.A.	0.69	N.A.
	Operable	Tinted	N.A.	0.53	N.A.
	Fixed	Tinted	N.A.	0.57	N.A.
Nonmetal	Operable	Clear	0.74	0.65	0.70
	Fixed	Clear	0.76	0.67	0.67
	Operable	Tinted	0.60	0.53	N.A.
	Fixed	Tinted	0.63	0.55	N.A.
.Translucent or transparent panels shall use glass block values when not rated by NFRC 200.					
.Visible Transmittance (VT) shall be calculated by using Reference Nonresidential Appendix NA6.					
.Windows with window film applied that is not rated by NFRC 200 shall use the default values from this table.					

Standards Tables 150.1-A

STANDARDS TABLE 150.1-A COMPONENT PACKAGE A

			Climate Zone																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
Building Envelope	Insulation¹	Roofs /Ceilings U / R-Value		U 0.025 /R38	U 0.031/R 30										U 0.025 /R 38					
		Walls	2x4 Framed ²	U 0.065 /R 15+4/ or R 13+5																
				12345678910111213141516																
			Mass Wall Interior³	U 0.070 /R 13															U 0.059 /R 17	
			Mass Wall Exterior³	U 0.125 /R 8.0															U 0.070 /R 13	
			Below Grade Interior³	U 0.070 /R 13															U 0.066 /R 15	
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
			Below Grade Exterior³	U 0.200 /R 5.0														U 0.100 /R 10		U 0.053 /R 19
			Floors	Slab Perimeter	NR															U 0.58 /R 7
		Raised		U 0.037 /R 19																
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
		Concrete Raised		U 0.092 R 8.0		U 0.269 /R 0.0										U 0.092 /R 8.0	U 0.138 /R 4.0	U 0.092 /R 8.0	U 0.092 /R 8.0	U 0.138 /R 4.0
		Radiant Barrier		NR	REQ															NR
	Building Envelope Roofing Products	Low- sloped		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Aged Solar Reflectance			NR												0.63	NR	0.63	NR		
		Thermal Emittance	NR												0.75	NR	0.75	NR		
Steepest Slope		Aged Solar Reflec- tance	NR										0.20						NR	

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Thermal Emittance	NR									0.75						NR
Fenestration	Maximum U-factor ⁴	0.32																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
	Maximum SHGC ⁵	NR	0.25	NR	0.25	NR	0.25											
	Maximum Total Area	20%																
	Maximum West Facing Area	NR	5%	NR	5%	NR	5%											

TABLE 150.1-A COMPONENT PACKAGE A (continuation)

		12345678910111213141516																
HVAC SYSTEM	Space Heating	Electric Resistance Allowed	Not Allowed															
		If gas, AFUE	Minimum															
		If Heat Pump, HSPF ⁶	Minimum															
	Space Cooling	SEER	Minimum															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		Refrigerant Charge Verification or Charge Indicator Display	NR	REQ	NR					REQ								NR
		Whole House Fan ⁷	NR							REQ							NR	NR
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Central System Air Handler	Central Fan Integrated Ventilation Systems Fan Efficacy	REQ															
	Ducts	Duct Insulation	R-6										R-8	R-6		R-8	R-8	R-8
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Water Heating	All Buildings	System Shall meet Section 150.1(c)8																

Footnote requirements to TABLE 150.1-A

1. The U-factors/R-values shown for ceiling, wall and raised floor insulation are for wood-frame construction with insulation installed between the framing members. For alternative construction assemblies, see Section 150.1(c)1A, B and C.
2. U-factors can be met by cavity insulation alone or with continuous insulation alone, or with both cavity and continuous insulation that results in a U-factor equal to or less than the U-factor shown. "R-15+4" means R-15 cavity insulation plus R-4 continuous insulation. Any combination of cavity insulation and/or continuous insulation that results in a U-factor equal to or less than 0.065 is allowed, such as R-13+5.
3. Mass wall has a thermal heat capacity greater than or equal to 7.0 Btu/h-ft². Below grade "interior" denotes insulation installed on the inside surface of the wall. Below grade "exterior" denotes insulation installed on the outside surface of the wall.

4. The installed fenestration products shall meet the requirements of Section 150.1(c)3.
5. The installed fenestration products shall meet the requirements of Section 150.1(c)4.
6. HSPF means "heating seasonal performance factor."
7. When whole house fans are required (REQ), only those whole house fans that are listed in the Appliance Efficiency Directory may be installed. Compliance requires installation of one or more WHFs whose total airflow CFM is capable of meeting or exceeding a minimum 2 cfm/square foot of conditioned floor area per Section 150.1(c)12.
8. A supplemental heating unit may be installed in a space served directly or indirectly by a primary heating system, provided that the unit thermal capacity does not exceed 2 kilowatts or 7,000 Btu/hr and is controlled by a time-limiting device not exceeding 30 minutes.

Standards Tables 150.2-A AGED SOLAR REFLECTANCE INSULATION TRADE OFF TABLE

TABLE 150.2-A AGED SOLAR REFLECTANCE INSULATION TRADE OFF TABLE

Aged Solar Reflectance	Roof Deck Insulation R-value	Aged Solar Reflectance	Roof Deck Insulation R-value
0.62-0.60	2	0.44-0.40	12
0.59-0.55	4	0.39-0.35	16
0.54-0.50	6	0.34-0.30	20
0.49-0.45	8	0.29-0.25	24

Residential Table – Vintage Table Values**TABLE R3-50 – DEFAULT ASSUMPTIONS FOR EXISTING BUILDINGS – VINTAGE TABLE VALUES**

Default Assumptions for Year Built (Vintage)

Conservation Measure	Before 1978	1978 to 1983	1984 to 1991	1992 to 1998	1999 - 2000	2001- 2003	2004- 2005	2006 and 2012	2013 and Later
INSULATION U-FACTOR									
Roof/Ceiling	0.079	0.049	0.049	0.049	0.049	0.049	0.049	0.049	
Wall	0.356	0.110	0.110	0.102	0.102	0.102	0.102	0.102	
Raised Floor –Crawl Space	0.099	0.099	0.099	0.046	0.046	0.046	0.046	0.046	
Cool Roof	0.10	0.10	0.10	0.10	0.10	0.10	0.10	Pres Pkg.	
Radiant Barrier	None	None	None	None	None	None	Pres Pkg.	Pres Pkg.	
Raised Floor-No Crawl Space	0.238	0.238	0.238	0.064	0.064	0.064	0.064	0.064	
Slab Edge F-factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	
Ducts	R-2.1	R-2.1	R-2.1	R-4.2	R-4.2	R-4.2	R-4.2	Pres Pkg.	
LEAKAGE									
Building (SLA)	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	
Duct Leakage Factor (See Table 4-13)	0.86	0.86	0.86	0.86	0.86	0.89	0.89	0.89	
FENESTRATION									
U-factor	Use Standards Table 110.6-A , §110.6 for all Vintages								
SHGC	Use Standards Table 110.6-B , §110.6 for all Vintages								
Shading Dev.	Use Table R3-27 and R3-28 for all Vintages in the Residential ACM Manual – Performance Approach								
SPACE HEATING EFFICIENCY									
Gas Furnace (Central) AFUE	0.75	0.78	0.78	0.78	0.78	0.78	0.78	0.78	
Gas Heater (Room) AFUE	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	
Hydronic/Comb Hydronic	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	
Heat Pump HSPF	5.6	5.6	6.6	6.6	6.8	6.8	6.8	7.4	
Electric Resistance HSPF	3.413	3.413	3.413	3.413	3.413	3.413	3.413	3.413	
Electric Resistance Radiant HSPF	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55	
SPACE COOLING EFFICIENCY									
All Types, SEER	8.0	8.0	8.9	9.7	9.7	9.7	9.7	13.0	
WATER HEATING									
Energy Factor	0.525	0.525	0.525	0.525	0.575	0.575	0.575	0.575	

Appliance Efficiency Standards from Section 1605.1

Table B-2
Standards for Room Air Conditioners and Room Air-Conditioning Heat Pumps

Appliance	Louvered Sides	Cooling Capacity (Btu/hr)	Minimum EER
Room Air Conditioner	Yes	< 6,000	9.7
Room Air Conditioner	Yes	≥ 6,000 – 7,999	9.7
Room Air Conditioner	Yes	≥ 8,000 – 13,999	9.8
Room Air Conditioner	Yes	≥ 14,000 – 19,999	9.7
Room Air Conditioner	Yes	≥ 20,000	8.5
Room Air Conditioner	No	< 6,000	9.0
Room Air Conditioner	No	≥ 6,000 – 7,999	9.0
Room Air Conditioner	No	≥ 8,000 – 19,999	8.5
Room Air Conditioner	No	≥ 20,000	8.5
Room Air Conditioning Heat Pump	Yes	< 20,000	9.0
Room Air Conditioning Heat Pump	Yes	≥ 20,000	8.5
Room Air Conditioning Heat Pump	No	< 14,000	8.5
Room Air Conditioning Heat Pump	No	≥ 14,000	8.0
Casement-Only Room Air Conditioner	Either	Any	8.7
Casement-Slider Room Air Conditioner	Either	Any	9.5

Table B-3

Standards for Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps

Appliance	Mode	Cooling Capacity (Btu/hr)	Minimum EER or COP
Packaged terminal air conditioners and packaged terminal heat pumps	Cooling	$\leq 7,000$	8.88 EER
		$> 7,000$ and $< 15,000$	$10.0 - (0.00016 \times \text{Cap.})$ EER
		$\geq 15,000$	7.6 EER
Packaged terminal heat pumps	Heating	Any	$1.3 + [0.16 (10.0 - 0.00016 \times \text{Cap.})]$ COP
Cap. = cooling capacity (Btu/hr)			

TableC3
Standards for Air-Cooled Air Conditioners and Air-Source Heat Pumps Subject to EPart
(Standards Effective January 1, 2010 do not apply To Single Package Vertical Air Conditioners)

Appliance	Cooling Capacity (Btu/hr)	System Type	Minimum Efficiency			
			Effective January 1, 1994 ¹ or January 1, 1995 ²	Effective June 15, 2008	Effective January 1, 2010	
					Air Conditioners	Heat Pumps
Air-cooled unitary air conditioners and heat pumps (cooling mode)	< 65,000 *	Split system	10.0 SEER ¹	13.0 SEER		
	< 65,000 *	Single package	9.7 SEER ¹	13.0 SEER		
	≥ 65,000 and < 135,000	All	8.9 EER ¹		11.2 EER ³ 11.0 EER ⁴	11.0 EER ³ 10.8 EER ⁴
	≥ 135,000 and < 240,000	All	8.5 EER ²		11.0 EER ³ 10.8 EER ⁴	10.6 EER ³ 10.4 EER ⁴
	≥ 240,000 and < 760,000	All			10.0 EER ³ 9.8 EER ⁴	9.5 EER ³ 9.3 EER ⁴
Air-cooled unitary air-conditioning heat pumps (heating mode)	< 65,000 *	Split system	6.8 HSPF ¹	7.7 HSPF		
	< 65,000 *	Single package	6.6 HSPF ¹	7.7 HSPF		
	≥ 65,000 and < 135,000	All	3.0 COP ¹		3.3 COP	
	≥ 135,000 and < 240,000	All	2.9 COP ²		3.2 COP	
	≥ 240,000 and < 760,000	All			3.2 COP	
[*] Three phase models only.						
³ Applies to equipment that has electric resistance heat or no heating.						
⁴ Applies to equipment with all other heating-system types that are integrated into the unitary equipment.						

Table C-4
Standards for Evaporatively-Cooled Air Conditioners

<i>Appliance</i>	<i>Cooling Capacity (Btu per hour)</i>	<i>Minimum EER</i>	
		<i>Effective October 29, 2003</i>	<i>Effective October 29, 2004</i>
<i>Evaporatively-cooled air conditioners</i>	< 65,000	12.1	12.1
	≥ 65,000 and < 135,000	11.5 ¹	11.5 ¹
	≥ 135,000 < 240,000	9.6	11.0
<i>Deduct 0.2 from the required EER for units with heating sections other than electric resistance heat.</i>			

Table C-6
**Standards for Single Package Vertical Air Conditioners and Single Package Vertical Heat Pumps
Manufactured on or After January 1, 2010**

<i>Appliance</i>	<i>Cooling Capacity (BTU/hr)</i>	<i>System Type</i>	<i>Minimum Efficiency</i>	
			<i>Cooling Mode</i>	<i>Heating Mode</i>
<i>Single package vertical air conditioners</i>	< 65,000	Single-phase	9.0 EER	N/A
	< 65,000	3-phase	9.0 EER	N/A
	≥ 65,000 and < 135,000	All	8.9 EER	N/A
	≥ 135,000 and < 240,000	All	8.6 EER	N/A
<i>Single package vertical heat pumps</i>	< 65,000	Single-phase	9.0 EER	3.0 COP
	< 65,000	3-phase	9.0 EER	3.0 COP
	≥ 65,000 and < 135,000	All	8.9 EER	3.0 COP
	≥ 135,000 and < 240,000	All	8.6 EER	2.9 COP

Table E-2
Standards for Gas Wall Furnaces, Floor Furnaces, and Room Heaters

<i>Appliance</i>	<i>Design Type</i>	<i>Capacity (Btu per hour)</i>	<i>Minimum AFUE (%)</i>
Wall furnace	Fan	≤ 42,000	73
Wall furnace	Fan	> 42,000	74
Wall furnace	Gravity	≤ 10,000	59
Wall furnace	Gravity	> 10,000 ≤ 12,000	60

Wall furnace	Gravity	> 12,000 ≤ 15,000	61
Wall furnace	Gravity	> 15,000 ≤ 19,000	62
Wall furnace	Gravity	> 19,000 ≤ 27,000	63
Wall furnace	Gravity	> 27,000 ≤ 46,000	64
Wall furnace	Gravity	> 46,000	65
Floor furnace	All	≤ 37,000	56
Floor furnace	All	> 37,000	57
Room heater	All	≤ 18,000	57
Room heater	All	> 18,000 and ≤ 20,000	58
Room heater	All	> 20,000 and ≤ 27,000	63
Room heater	All	> 27,000 and ≤ 46,000	64
Room heater	All	> 46,000	65

Table E-3
Standards for Gas- and Oil-Fired Central Boilers and Electric Residential Boilers

Appliance	Rated Input (Btu/hr)	Minimum Efficiency (%)		
		AFUE		Combustion Efficiency at Maximum Rated Capacity Effective January 1, 1994
		Effective January 1, 1992	Effective September 1, 2012	
Gas steam boilers with single phase electrical supply	< 300,000	75	80 ¹	—
Gas hot water boilers with single phase electrical supply	< 300,000	80	82 ^{1,2}	—
Oil steam boilers with single phase electrical supply	< 300,000	—	82	—
Oil hot water boilers with single phase electrical supply	< 300,000	—	84 ²	—
Electric steam residential boilers		—	NONE	—
Electric hot water residential boilers		—	NONE ²	—
All other boilers with single phase electrical supply	< 300,000	80	—	—
Gas packaged boilers	≥ 300,000	—	—	80
Oil packaged boilers	≥ 300,000	—	—	83

¹ No constant burning pilot light design standard effective September 1, 2012.
² Automatic means for adjusting temperature design standard effective September 1, 2012.

Table F-3
Standards for Large Water Heaters Effective October 29, 2003

<i>Appliance</i>	<i>Input to Volume Ratio</i>	<i>Size (Volume)</i>	<i>Minimum Thermal Efficiency (%)</i>	<i>Maximum Standby Loss^{1,2}</i>
Gas storage water heaters	< 4,000 Btu/hr/gal	any	80	$Q/800 + 110(V_r)^{1/2}$ Btu/hr
Gas instantaneous water heaters	$\geq 4,000$ Btu/hr/gal	< 10 gal	80	–
		≥ 10 gal	80	$Q/800 + 110(V_r)^{1/2}$ Btu/hr
Gas hot water supply boilers	$\geq 4,000$ Btu/hr/gal	< 10 gal	80	–
		≥ 10 gal	80	$Q/800 + 110(V_r)^{1/2}$ Btu/hr
Oil storage water heaters	< 4,000 Btu/hr/gal	any	78	$Q/800 + 110(V_r)^{1/2}$ Btu/hr
Oil instantaneous water heaters	$\geq 4,000$ Btu/hr/gal	< 10 gal	80	–
		≥ 10 gal	78	$Q/800 + 110(V_r)^{1/2}$ Btu/hr
Oil hot water supply boilers	$\geq 4,000$ Btu/hr/gal	< 10 gal	80	–
		≥ 10 gal	78	$Q/800 + 110(V_r)^{1/2}$ Btu/hr
Electric storage water heaters	< 4,000 Btu/hr/gal	any	–	$0.3 + 27/V_m$ %/hr

Standby loss is based on a 70° F temperature difference between stored water and ambient requirements. In the standby loss equations, V_r is the rated volume in gallons, V_m is the measured volume in gallons, and Q is the nameplate input rate in Btu/hr.

¹ Water heaters and hot water supply boilers having more than 140 gallons of storage capacity are not required to meet the standby loss requirement if the tank surface is thermally insulated to R-12.5, if a standing pilot light is not installed, and for gas- or oil-fired storage water heaters, there is a flue damper or fan-assisted combustion.

Table F-4
Standards for Small Federally-Regulated Water Heaters

<i>Appliance</i>	<i>Minimum Energy Factor</i>	
	<i>Effective April 15, 1991</i>	<i>Effective January 20, 2004</i>
Gas-fired storage-type water heaters	$0.62 - (.0019 \times V)$	$0.67 - (.0019 \times V)$
Oil-fired water heaters (storage and instantaneous)	$0.59 - (.0019 \times V)$	$0.59 - (.0019 \times V)$
Electric storage water heaters (excluding tabletop water heaters)	$0.93 - (.00132 \times V)$	$0.97 - (.00132 \times V)$
Electric tabletop water heaters	$0.93 - (.00132 \times V)$	$0.93 - (.00132 \times V)$
Gas-fired instantaneous water heaters	$0.62 - (.0019 \times V)$	$0.62 - (.0019 \times V)$
Electric instantaneous water heaters (excluding tabletop water heaters)	$0.93 - (.00132 \times V)$	$0.93 - (.00132 \times V)$
Heat pump water heaters	$0.93 - (.00132 \times V)$	$0.97 - (.00132 \times V)$

V = rated volume in gallons.

